CMS/LHC Status Report

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Communication from the CERN DG

"….we remain on course to restart the LHC safely this year, albeit currently about 2-3 weeks later than we'd hoped at Chamonix."

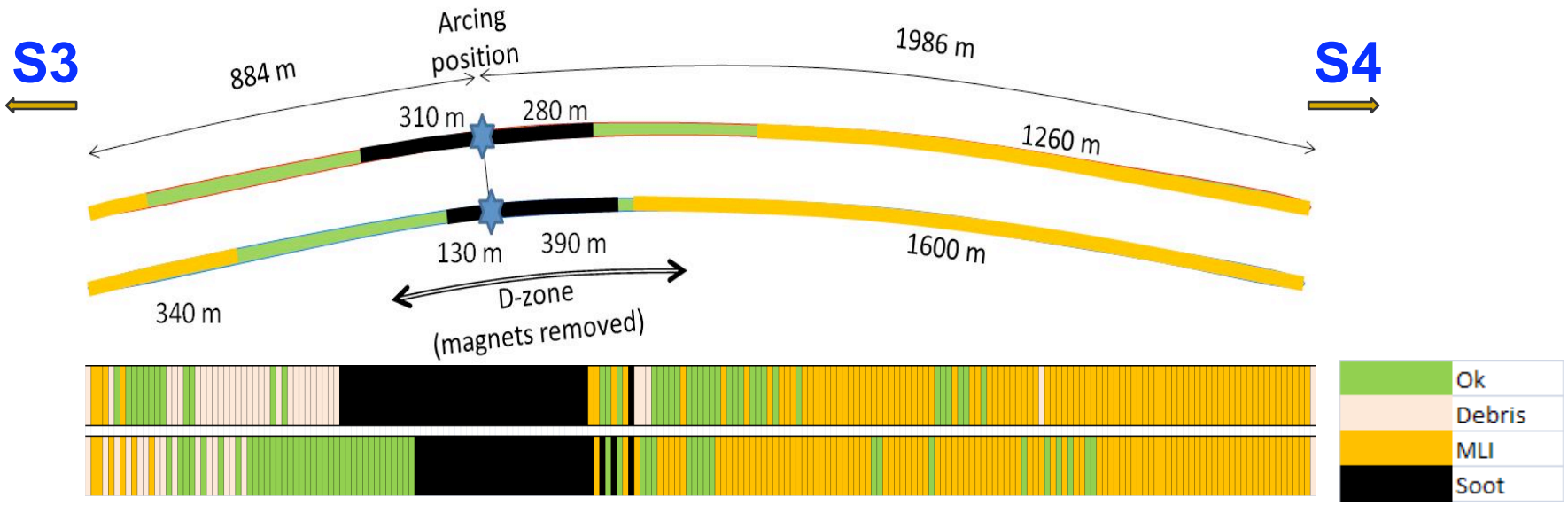
"…will be ready by September or October to run ... in the range 4-5 TeV per beam."

Communication from the CMS spokesperson

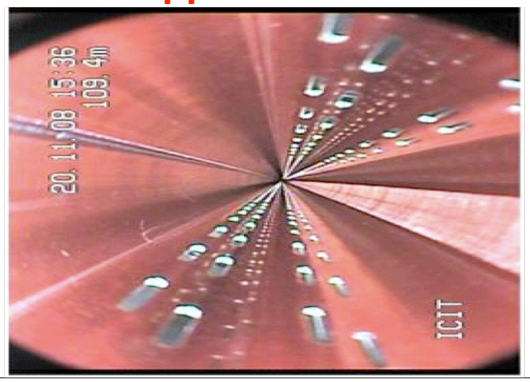
CMS now moving **out of "maintenance" state** & moving **into "beam-ready" state.**

All Experimenters' Meeting, July 6, 2009

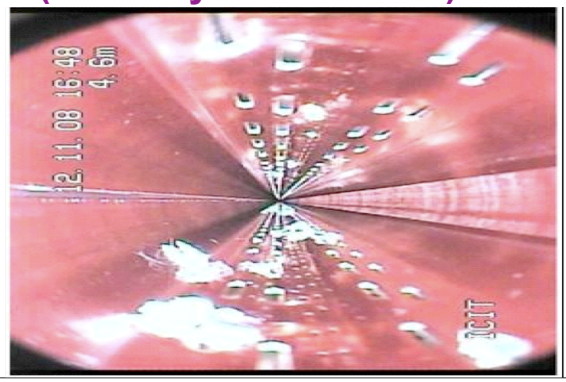
LHC status: Vacuum cleaning in sector 3–4 done



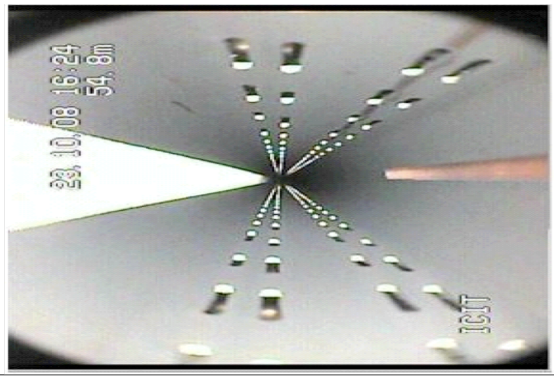
Beam Screen (BS): Clean copper surface



BS contaminated by MLI (multi layer insulation)



BS contaminated by soot. Gray color varies with soot thickness.



Enhanced Quench Protection System

✦Repair in sector 3-4 has revealed new facts concerning the copper bus bar in which the superconductor is embedded.

✦The process of soldering the superconductor in interconnecting splices can cause discontinuity between the superconducting cable and the copper busbar joint

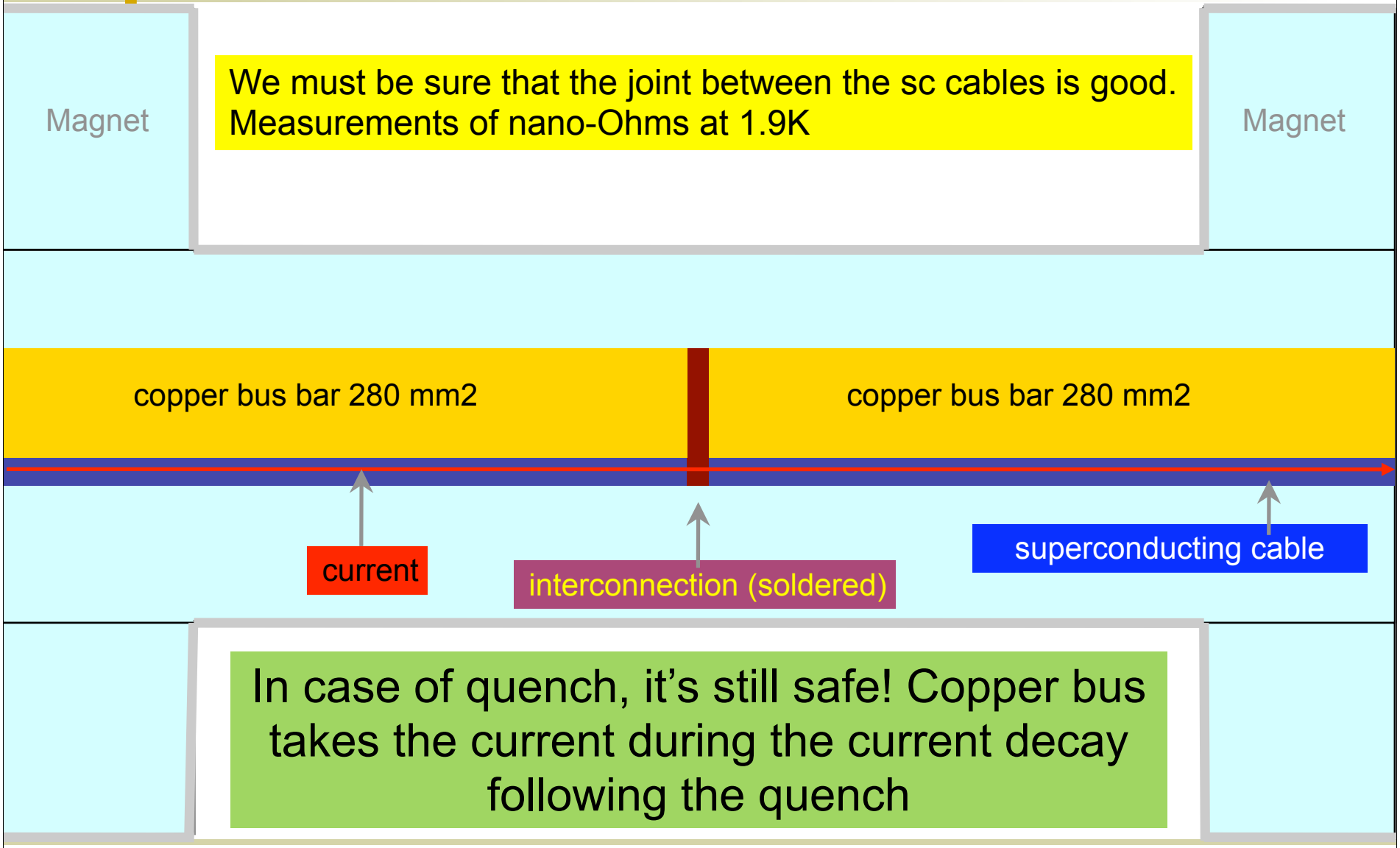
➡Dangerous in case of a quench

✦Studies are ongoing to find a safe limit for the joint resistance as a function of the current in magnet circuits (max energy in the machine)

QPS upgrade allows precision measurements of the joint resistance (sub-nΩ range) for every Busbar segment.

This will allow complete mapping of the splice resistances.

Good interconnect



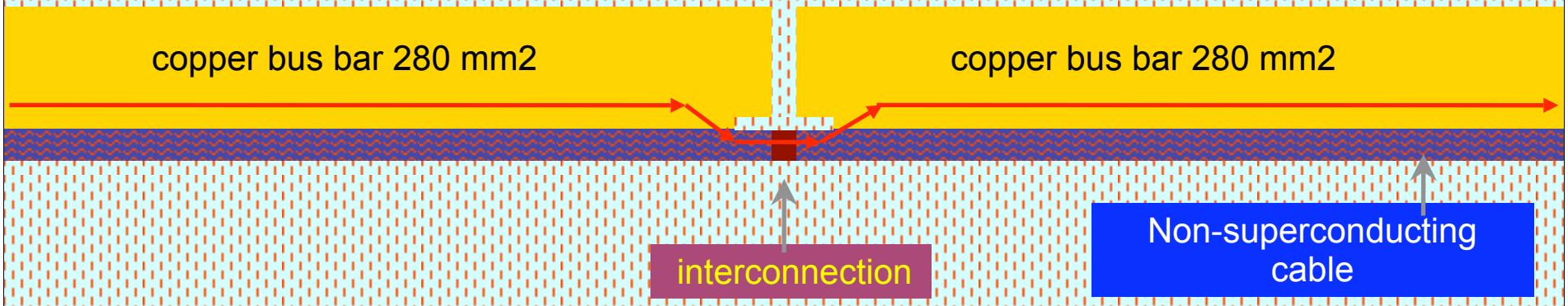
Bad interconnect: problem after quench

No problem while the sc cable remains superconducting. But in case of quench:

Current path is deviated through the sc cable (which is no longer sc). Depending on the current and length of this path, the cable can suffer thermal runaway.

Magnet

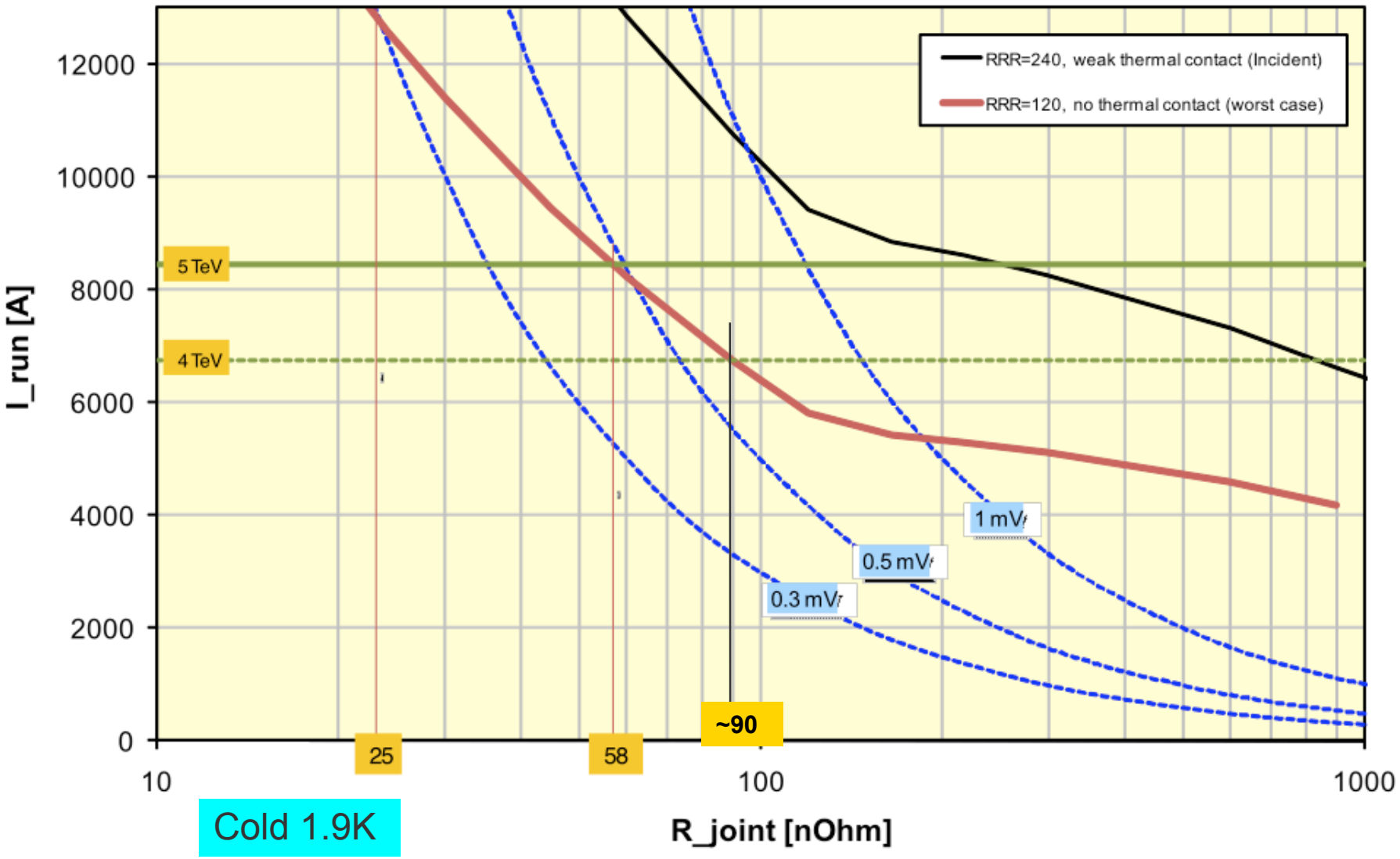
Magnet



Danger of melting the sc cable then electrical arc

Need to ensure that the copper stabilizer is continuous. Measurements of micro-Ohms at warm/cold performed.

Maximum safe current vs joint resistance



LHC Schedule Snapshot today

✦3 weeks delay with respect to baseline due to

- Splice measurements and repairs
- Delay in cool down of S12 and repairs of splices
- (Re-warming of S45)

✦Plan

- Need to measure the remaining sectors (S23, S78, and S81) at 80K ?
- Repair any high resistance splices (at 300K) !
- Measure S45 at 300k
- Prepare scenarios of safe operating energy vs date of first collisions
  - » Degree of repair of splices
- At start-up confirm all splice resistance measurements at cold

For more details, see presentation by Steve Myers (CERN director) on July 2nd:

http://indico.cern.ch/conferenceDisplay.py?confId=62277

CMS Status

Some highlights:

- completion of the revision of the tracker cooling plant
- completion, installation and commissioning of the preshower (ES) detector in both endcaps of ECAL
- endcap ECAL triggers have been installed and tested
- re-commissioning of CMS – global runs with cosmic/0T continuing

Target:

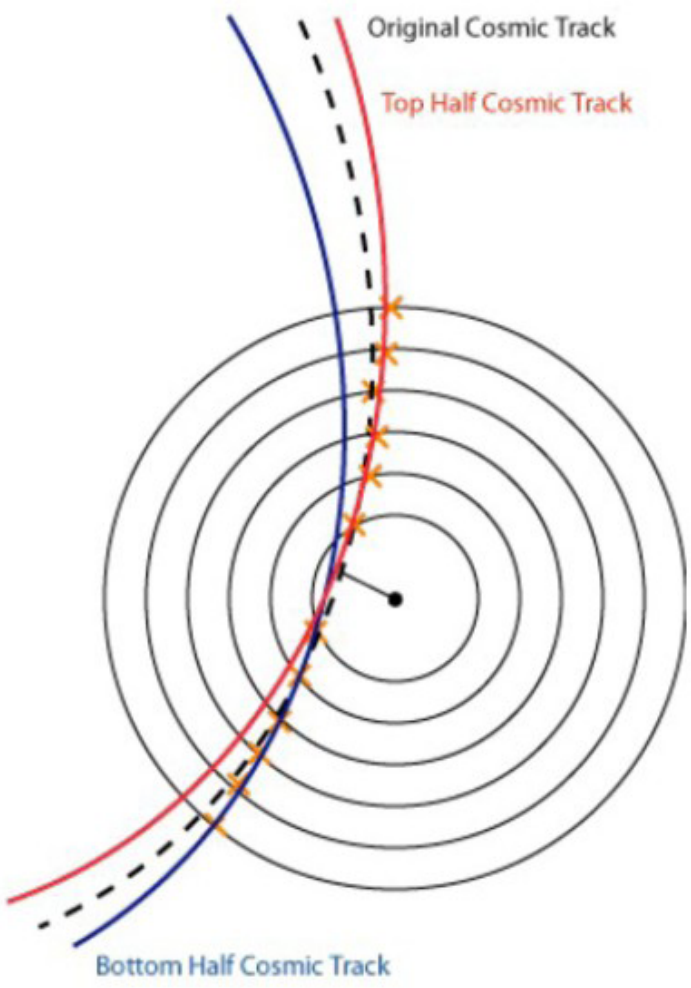
Close and start cosmic runs with magnet on (4T) by July 22nd – stable data taking prior to beam

Tracker is back on track

• **Strip Tracker** Operations resumed on June 10th after 7 month shutdown. Commissioning is progressing well. To be ready for 4T run.

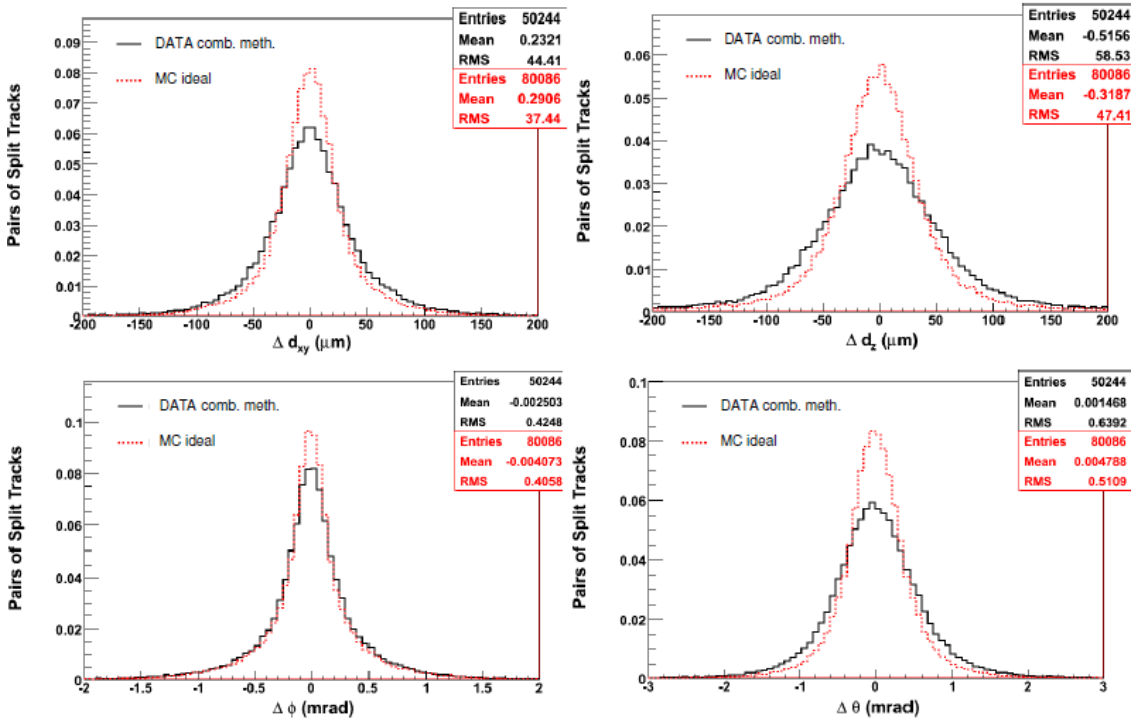
• **Pixel Detector** has been running at 4^{0}C since mid May. Participating in cosmic global runs.

Tracking Performance after Alignment



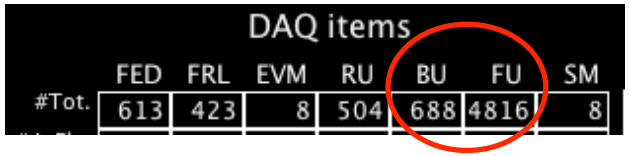
- **Method of using split tracks**

Cosmic Track Splitting: absolute residuals (ALIGN vers.)



Global Run Highlights

[slide from CMS plenary talk by Commissioning Coordinator, June 22 '09]



- DAQ
  - Full Event Filter farm
  - Routinely all participating readout FEDs to 90 kHz (~8% deadtime)
  - Centralized DAQ error reporting GUI ("Hotspot")
- L1 Trigger hardware commissioning
  - Comprehensive set of calorimeter trigger firmware deployed:
    - HF minbias, Single Jet, Single EGamma, MET, ECAL Endcap trigger
  - New Drift Tube Track-Finder hardware commissioning
  - New RPC cosmic technical trigger (for cosmics during collisions)
  - New CSC Track-Finder commissioning
- Services (cooling, power, ventilation) more reliable than last year
- Systematic accounting of downtime: "Run time logger" in development
- Web-based monitoring is now remotely available again, passing security reviews

(developed at Fermilab)

Snapshot of the CMS web-based monitoring

CMS Web-Based Monitoring

Subdetectors WBM
ECALSummary
DTHVmon
HCALSummary, *coming soon*
CSCSummary

Core Services
RunSummary [24h] [24h&1+trig]
RunTimeSummary (DownTime logger)
TriggerRates
LumiScalers
LastValue
ConditionBrowser
MagnetHistory
LhcMonitor | BLM | BPM
PageZero

Links
DQM Run Registry
Online DQM GUI
CMS Online
FNAL ROC
Commissioning & Run Coordination
Shift ELog

WBM Twiki Page | WBM Support & Contact
Last modified: 2009.03.25 14:02:20 UTC

Other developments and plans

Concern about ECAL endcap trigger readout:

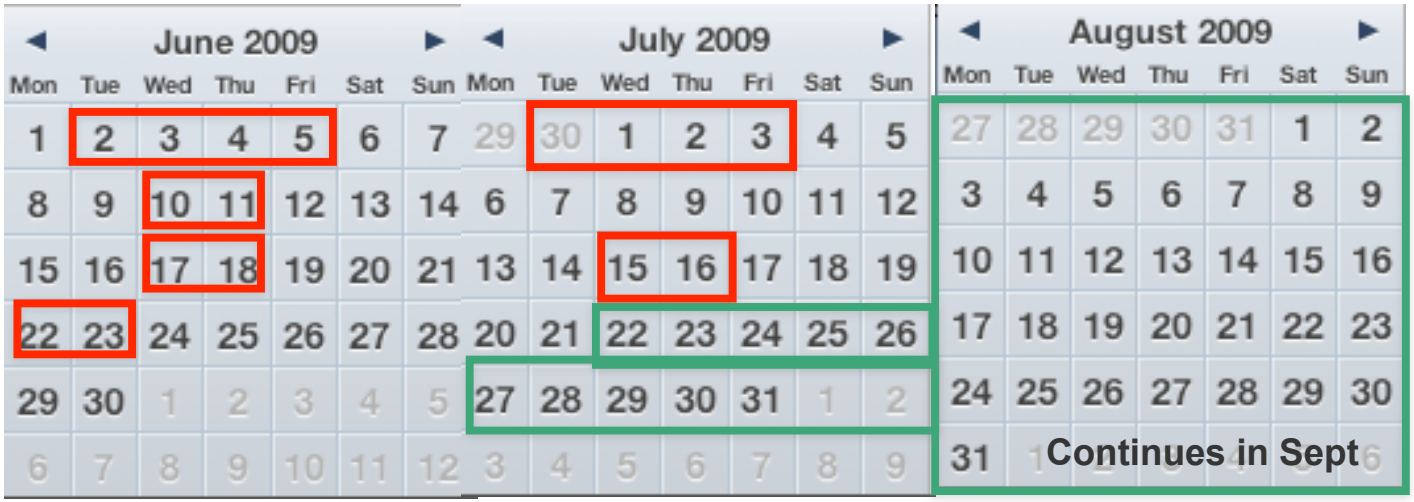
- Last batch of ECAL endcap (EE) readout boards (DCC) was bad & cannot be repaired.
- Need to make new ones.

→ Problems with the manufacture.

-Hope to have 6 by August. Need 5 to complete whole EE trigger.

-Spares to follow in September.

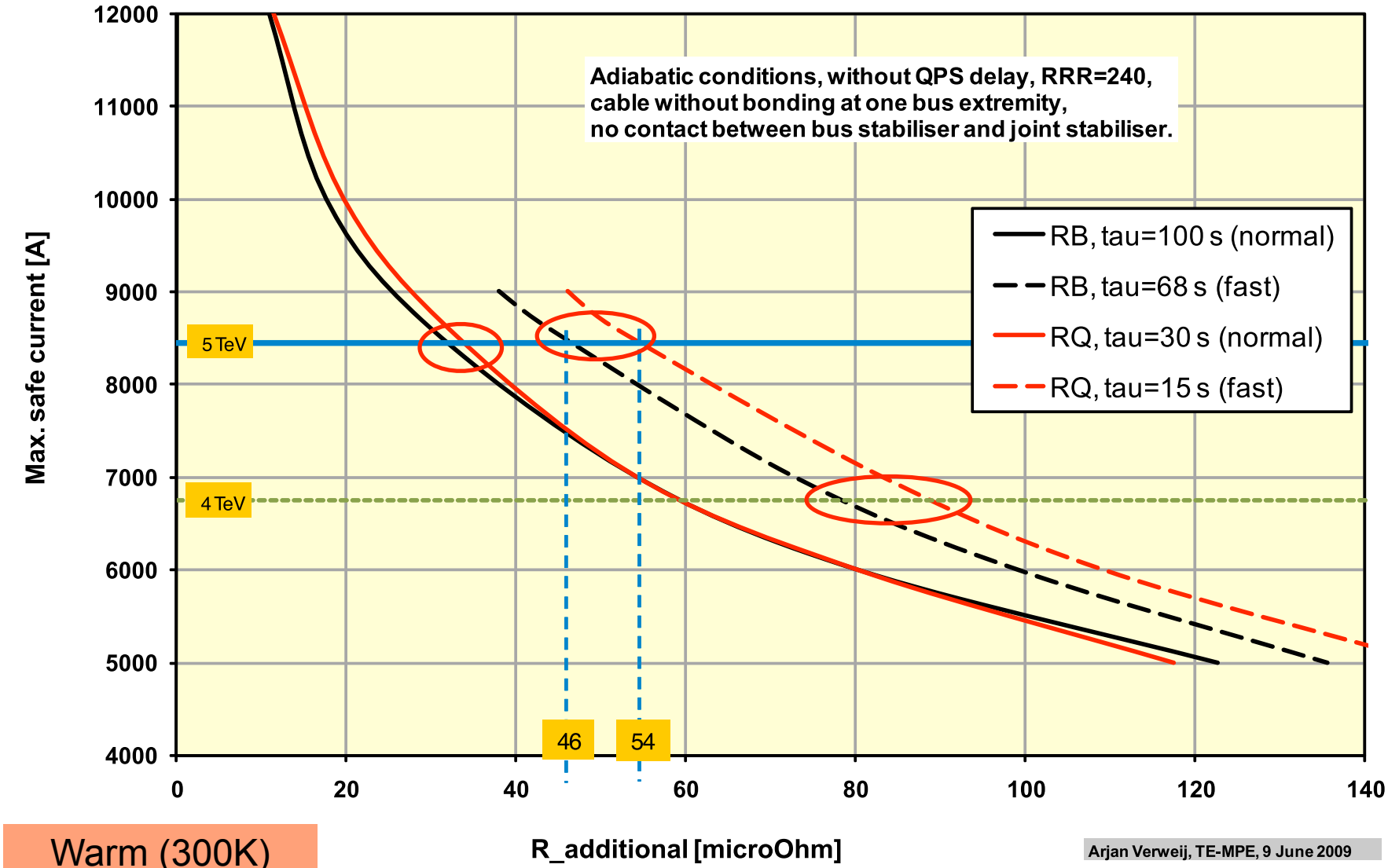
Cosmic runs with OT/4T



CMS is again Ready and Waiting!

Backup slides

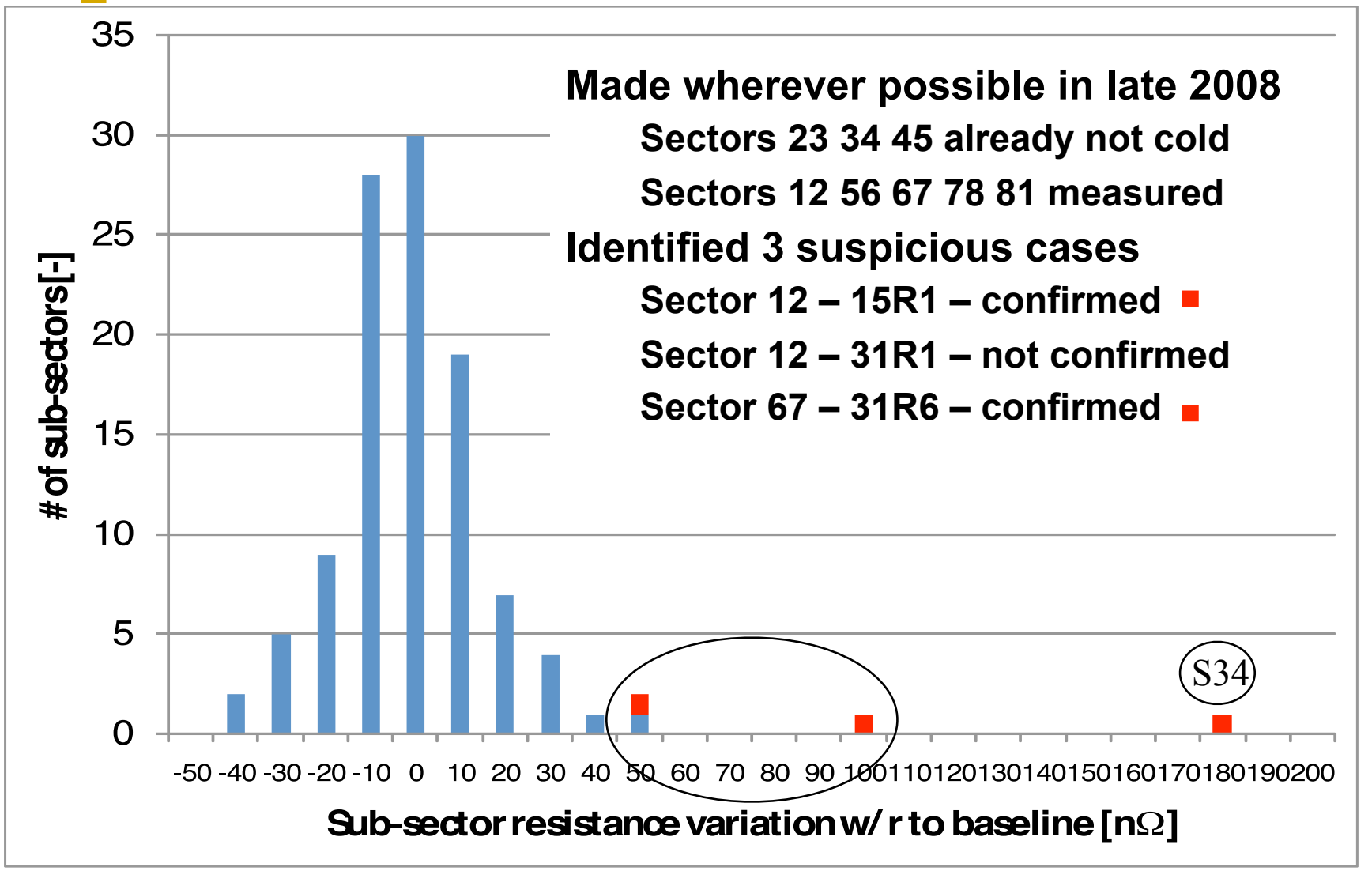
Maximum safe current vs joint resistance



Warm (300K)

Arjan Verweij, TE-MPE, 9 June 2009

Joint resistance measurements



Splice measurement status

Sector	Status on June 5 2009	Splices Calorimetric Ohmic		Stabilizers Biddle R16		Stabilizers Biddle	
		1.9K 7kA		Warm		80K	
		Dipoles	Quads	Dipoles	Quads	Dipoles	Quads
12	warm	Done	Done	Done	Done	No need	No need
23	2K						
34	warm			Done	Done	No need	No need
45	80K					Analysis	Problems
56	warm	Done	Done	Done	Done	No need	No need
67	warm	Done	Done	Done	Done	No need	No need
78	40K	Done	Done				
81	40K	Done	Done				